2007 Boulder Summer School
Biological Physics
July 2 – July 27, 2007
Schedule

Week 1: July 2 – 6, Location: Duane G125

Monday, July 2	
9:30 – 10:00 AM	Welcome
10:00 – 10:30	Break
10:30 – 12:00	Physics Problems in Early Embryonic Development, Part I (Bialek)
1:30 – 3:00 PM	Physics Problems in Early Embryonic Development, Part II (Gregor)
3:00 – 3:30	Break
3:30 – 5:00	Construction Plans for Cells and Organisms (Kondev)
Tuesday, July 3	
10:00 – 11:30 AM	Biopolymers (Nelson)
1:30 – 3:00 PM	Life's Processes: Stopwatches at Many Scales (Kondev)
3:00 – 3:30	Break
3:30 – 5:00	Molecular Motors, Part I (Betterton)
Wednesday, July 4	
Independence Day: No Classes	
Thursday, July 5	
10:00 – 11:30 AM	Tethered Particle Motion as a Diagnostic of DNA Conformation (Nelson)
1:30 – 2:00 PM	Rods, Ropes and Chromosomes (Kondev)
3:00 – 3:30	Break
3:30 – 5:00	Molecular Motors, Part II (Betterton)
Friday, July 6	
10:00 – 11:30 AM	Physics Problems in Early Embryonic Development, Part III (Gregor)
1:30 – 3:00 PM	Maximum Likelihood Methods (Nelson)
3:00 – 3:30	Break
3:30 – 5:00	Tutorial: Topic TBD (TBD)
5:00 – 7:00	Kittredge Pond BBQ

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Week 2: July 9 – 13, Location: Duane G125

Monday, July 9	
9:00 – 10:30 AM	Tutorial: Noise and Fluctuations (Bialek)
10:30 – 11:00	Break
11:00 – 12:30 PM	Biological Applications of the Physics of Diffusion (Setayeshgar)
2:00 – 3:30	Life at Low Reynolds Number and Bacterial Chemotaxis (Wingreen)
Tuesday, July 10	
9:00 – 10:30 AM	Bacterial Chemotaxis Signaling Network as a Model System (Wingreen)
10:30 – 11:00	Break
11:00 – 12:30 PM	Tutorial: Nonlinear Dynamics (Sengupta)
2:00 – 3:30	Tutorial: Ion Channels and Neural Dynamics (TBD)
5:15 – 7:30	Flagstaff Mountain Cookout (dinner and hiking) Buses leave Kittredge at **5:15PM** , **sharp**.
Wednesday, July 11	
9:00 – 10:30 AM	Biophysical Aspects of Bacterial Geometry (Wingreen)
10:30 – 11:00	Break
11:00 – 12:30 PM	Modeling Stochastic Gene Expression (Swain)
2:00 – 3:30	Linear Networks and How Neurons Do Integrals (Goldman)
Thursday, July 12	
9:00 – 10:30 AM	Network Dynamics and Cell Physiology (Tyson)
10:30 – 11:00	Break
11:00 – 12:30 PM	Measuring Stochastic Gene Expression (Swain)
2:00 – 3:30	Modeling Signal Transduction Networks, Part I (Shraiman)
7:00 – 9:00	Poster Session I (11^{th} floor of GamowTower)
Friday, July 13	
9:00 – 10:30 AM	Lessons from Modeling the Eukaryotic Cell Cycle (Tyson)
10:30 – 11:00	Break
11:00 – 12:30 PM	Robustness in Neural Networks (Goldman)
2:00 – 3:30	Modeling Signal Transduction Networks, Part II (Shraiman)
5:00 – 6:30	Kittredge Pond BBQ
7:00 – 9:00	Poster Session I (11^{th} floor of GamowTower)

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Week 3: July 16 – 20, Location: Duane G125

Monday, July 16	
9:00 – 10:30 AM	Gene Expression Data (Wiggins)
10:30 – 11:00	Break
11:00 – 12:30 PM	Reconstruction of Brain Circuits Using Electron Microscopy (Chklovskii)
2:00 – 3:30	Algorithms for Neural Circuit Reconstruction (Seung)
Tuesday, July 17	
9:00 – 10:30 AM	How to Combine Motif-Related Information to Explain Gene Expression Data (Wiggins)
10:30 – 11:00	Break
11:00 – 12:30 PM	Neuroeconomics (Seung)
2:00 – 3:30	Anatomy and Principles of Brain Design (Chklovskii)
Wednesday, July 18	
9:00 – 10:30 AM	Synaptic Basis of Reinforcement Learning (Seung)
10:30 – 11:00	Break
11:00 – 12:30 PM	What Physics-Inspired Bioinformatics Can Teach Us About Transcription Factor Binding and Evolution, Part I (Callan)
2:00 – 3:30	Neuronal Properties and the Maximum Entropy Principle (Chklovskii)
7:00 – 8:00	Public Lecture: More Perfect than we imagined: A physicist's view of life (Bialek) Room: **Duane Physics, Room: G1B20**
Thursday, July 19	
9:00 – 10:30 AM	What Physics-Inspired Bioinformatics Can Teach Us About Transcription Factor Binding and Evolution, Part II (Callan)
10:30 – 11:00	Break
11:00 – 12:30 PM	Stochastic Dynamics in Simple Models of Evolution, Part I (Desai)
2:00 – 3:30	Journal Club: Kinetic Proofreading
7:00 – 9:00	Poster Session II (11th floor of GamowTower)
Friday, July 20	
9:00 – 10:30 AM	Open
10:30 – 11:00	Break
11:00 – 12:30 PM	Stochastic Dynamics in Simple Models of Evolution, Part II (Desai)
2:00 – 3:30	Neural Adaptation to the Statistical Structure of the Environment (Fairhall)
5:00 – 6:30	Kittredge Pond BBQ
7:00 – 9:00	Poster Session II (11th floor of GamowTower)

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Week 4: July 23 – 27, Location: Duane G125

Monday, July 23	
9:00 – 10:30 AM	Genetic Basis of Phenotypic Variation, Part I (Kruglyak)
10:30 – 11:00	Break
11:00 – 12:30 PM	Coordinating Cell Divison with Growth (Coller)
2:00 – 3:30	Direct Observation of Dynamics in Transcription at the Single Molecule Level (Shaevitz)
Tuesday, July 24	
9:00 – 10:30 AM	Genetric Basis of Phenotypic Variation, Part II (Kruglyak)
10:30 – 11:00	Break
11:00 – 12:30 PM	A Brief History of the Cell Cycle (Coller)
2:00 – 3:30	Experimental Techniques in Small Scale Manipulation of Biological Systems (Shaevitz)
Wednesday, July 25	
9:00 – 10:30 AM	Student Presentations
10:30 – 11:00	Break
11:00 – 12:30 PM	Cellular Individuality in the Chemotactic Response of Dictyostelium (Samadani)
2:00 – 3:30	Student Presentations
Thursday, July 26	
9:00 – 10:30 AM	Student Presentations
10:30 – 11:00	Break
11:00 – 12:30 PM	Cellular Individuality in the DNA Repair Mechanism (Samadani)
2:00 – 3:30	Student Presentations
Friday, July 27	
9:00 – 10:30 AM	Student Presentations
10:30 – 11:00	Break
11:00 – 12:30 PM	Summary
2:00 – 3:30	Student Presentations
5:00 – 7:00	Kittredge Pond BBQ